1. (a) A girl's height is 1.623 m. Write her height **to the nearest cm**.

(b) The time taken to fill a tank was 2 hours 43 minutes. Write this time **to the nearest 5 minutes**.

(c) The attendance at a show was 2591 people. How many people, **to the nearest 100**, were at the show?

(d) The mean distance of the Moon from the Earth is approximately 384 403 km. Write this distance in the form $a \times 10^k$ where $1 \leq a < 10$ and $k \in \mathbb{Z}$.

(Total 4 marks)

2. The volume of a sphere is $V = \sqrt{\frac{S^3}{36\pi}}$, where S is its surface area.

The surface area of a sphere is 500 cm^2.

(a) Calculate the volume of the sphere. Give your answer correct to **two decimal places**.

(3)

(b) Write down your answer to (a) correct to the nearest integer.

(1)

(c) Write down your answer to (b) in the form $a \times 10^n$, where $1 \leq a < 10$ and $n \in \mathbb{Z}$.

(2)

(Total 6 marks)

3. A rectangle is 2680 cm long and 1970 cm wide.

(a) Find the perimeter of the rectangle, giving your answer in the form $a \times 10^k$, where $1 \leq a < 10$ and $k \in \mathbb{Z}$.

(3)

(b) Find the area of the rectangle, giving your answer correct to the nearest thousand square centimetres.

(Total 6 marks)

4. The speed of sound in air is given as 300 ms^{-1}.

(a) How many metres does sound travel in air in one hour?

(b) Express your answer to part (a)

(i) correct to **two** significant figures;

(ii) in the form $a \times 10^k$, where $1 \leq a < 10$ and $k \in \mathbb{Z}$.

(Total 4 marks)

5. Given that $h = \sqrt{l^2 - \frac{d^2}{4}}$,

(a) Calculate the **exact** value of h when $l = 0.03625$ and $d = 0.05$.

(2)

(b) Write down the answer to part (a) correct to three decimal places.

(1)

(c) Write down the answer to part (a) correct to three significant figures.

(1)

(d) Write down the answer to part (a) in the form $a \times 10^k$, where $1 \leq a < 10$, $k \in \mathbb{Z}$.

(2)

(Total 6 marks)

6. Given $p = x - \frac{\sqrt{y}}{z}$, $x = 1.775$, $y = 1.44$ and $z = 48$,

(a) calculate the value of p.

(2)

Barry **first** writes x, y and z correct to one significant figure and **then** uses these values to estimate the value of p.

(b) (i) Write down x, y and z each correct to one significant figure.

(ii) Write down Barry's estimate of the value of p.

(2)

(c) Calculate the percentage error in Barry's estimate of the value of p.

(2)

(Total 6 marks)

7. The total weight of 256 identical pencils is 4.24 kg. Calculate the weight of one pencil, in kg.

(a) Give your answer exactly.

(b) Give your answer correct to three significant figures.

(c) Write your answer to part (b) in the form $a \times 10^k$ where $1 \leq a < 10$ and $k \in \mathbb{Z}$.

(Total 8 marks)

8. Using the formula $V = \pi r^2 (H - h)$, and your calculator value of π, calculate the value of V when $r = 4.26$, $H = 21.58$ and $h = 14.35$.

(a) Give the full calculator display.

(b) Give your answer to two decimal places.

(c) Give your answer to two significant figures.

(d) Write your answer to part (c) in the form $a \times 10^k$ where $1 \leq a < 10$ and $k \in \mathbb{Z}$.

(Total 8 marks)

9. Anthony uses the formula

$$p = \frac{27q}{r+s}$$

to calculate the value of p when, correct to two decimal places, $q = 0.89$, $r = 1.87$ and $s = 7.22$.

(a) He estimates the value **without using a calculator**.

(i) Write down the numbers Anthony could use in the formula to estimate the value of p.

(ii) Work out the estimate for the value of p that your numbers would give.

(b) A calculator is to be used to work out the actual value of p.

To what degree of accuracy would you give your calculator answer? Give a reason for your answer.

(Total 4 marks)

10. Let $x = 7.94$.

(a) Calculate the value of $\frac{2x+1}{x^3}$.

(b) (i) Give your answer correct to **three** decimal places.

(ii) Write your answer to (b)(i) as a percentage.

(c) Give your answer to part (b)(i) in the form $a \times 10^k$, where $1 \leq a < 10$, $k \in \mathbb{Z}$.

(Total 6 marks)

11. A shipping container is a cuboid with dimensions 16 m, $1\frac{3}{4}$ m and $2\frac{2}{3}$ m.

(a) Calculate the **exact** volume of the container. Give your answer as a fraction.

(3)

Jim estimates the dimensions of the container as 15 m, 2 m and 3 m and uses these to estimate the volume of the container.

(b) Calculate the percentage error in Jim's estimated volume of the container.

(3)
(Total 6 marks)

12. In a television show there is a transparent box completely filled with identical cubes. Participants have to estimate the number of cubes in the box. The box is 50 cm wide, 100 cm long and 40 cm tall.

(a) Find the volume of the box.

(2)

Joaquin estimates the volume of one cube to be 500 cm^3. He uses this value to estimate the number of cubes in the box.

(b) Find Joaquin's estimated number of cubes in the box.

(2)

The actual number of cubes in the box is 350.

(c) Find the percentage error in Joaquin's estimated number of cubes in the box.

(2)
(Total 6 marks)

13. The following diagram shows a rectangle with sides of length 9.5×10^2 m and 1.6×10^3 m.

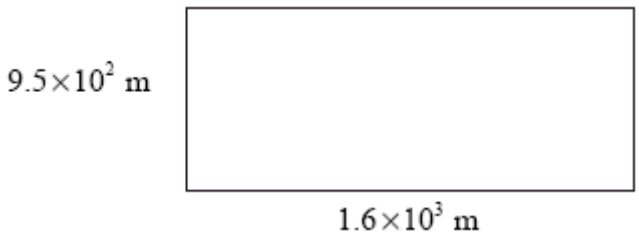

diagram not to scale

(a) Write down the area of the rectangle in the form $a \times 10^k$, where $1 \leq a < 10$, $k \in \mathbb{Z}$.

(3)

Helen's estimate of the area of the rectangle is 1 600 000 m^2.

(b) Find the percentage error in Helen's estimate.

(3)
(Total 6 marks)

14. (a) Calculate exactly $\frac{(3\times 2.1)^3}{7\times 1.2}$.

(1)

(b) Write the answer to part (a) correct to 2 significant figures.

(1)

(c) Calculate the percentage error when the answer to part (a) is written correct to 2 significant figures.

(2)

(d) Write your answer to **part (c)** in the form $a \times 10^k$ where $1 \leq a < 10$ and $k \in \mathbb{Z}$.

(2)

(Total 6 marks)

15. (a) Calculate $\frac{77.2\times 3^3}{3.60\times 2^2}$.

(1)

(b) Express your answer to part (a) in the form $a \times 10^k$, where $1 \leq a < 10$ and $k \in \mathbb{Z}$.

(2)

(c) Juan estimates the length of a carpet to be 12 metres and the width to be 8 metres. He then estimates the area of the carpet.

(i) Write down his estimated area of the carpet.

(1)

When the carpet is accurately measured it is found to have an area of 90 square metres.

(ii) Calculate the percentage error made by Juan.

(2)

(Total 6 marks)

16. A problem has an **exact** answer of $x = 0.1265$.

(a) Write down the **exact** value of x in the form $a\times 10^k$ where k is an integer and $1 \leq a \leq 10$.

(b) State the value of x given correct to **two** significant figures.

(c) Calculate the percentage error if x is given correct to **two** significant figures.

(Total 6 marks)